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Influence of pine wood nematode invasion on typical Masson pine ecosystem in Three Gorges Reservoir Region of China

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ABSTRACT:

Due to complex terrain and biological diversity, the Three Gorges Reservoir Region is becoming hot spot region for researches from China to the world. However in recent years, the invasion of *Bursaphelenchus xylophilus* (pine wood nematode ,PWN) caused a devastating impact on Masson pine stand ecosystem and terrible effects on water quality of Yangtze River as well as the ecological safety of Three Gorges Dam.The purpose of this research is to serve for protecting the ecological safety of Three Gorges Dam and pine resources in Three Gorges Reservoir region.Based on “sample plots setting” and “the measurement of all individual trees” methods, we analyzed the species composition , diversity changes and the dynamic changes of structure and function of Masson pine communities after attacked by PWN with different years（0year,1year,3year,5year and 7year） in 2012. Results indicated, for the pine stand ecosystem infected by PWN, pure Masson pine forest had evolved into coniferous and broad-leaved mixed forest. Moreover, the Masson pine was ranked as the dominant species meanwhile some broad-leaved trees, such as *Cinnamomum camphora*, *Quercus aliena*, *Quercus variabilis Blume* and *Loropetalum chinensis*, were ranked as the subdominant species. As for the indicators that reflect healthy status of Masson pine’s structure and function, the healthy pine stand ecosystem was higher than infected pine one. With the increasing of infected years, each indicator showed a trend of decreasing. Through analyzing the relationship between pine wilt disease and stand structure in infected pine stand ecosystem, results indicated that the invasion of PWN had great influence on biological diversity of arbor, shrub and herb. In general, the relationship between species diversity indicators and infected years followed the “Mid-altitude bulge” theory. Specifically, both one-year infected and seven-year infected Masson pine forest would have the decline of plant species diversity in certain degree. Various practices could be carried out to prevent the further spread of PWN, to

improve the simple structure of Masson pine forest into a complex one for increasing the pine forest resistant ability in Three Gorges Reservoir region.

Key words: Three Gorges Reservoir region; pine wilt disease; plant community; Masson Pine; ecosystem

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